

# The Role of the Operating Room Nurses in the Treatment of Necrotizing Fasciitis

By Amoy Lowe, RN, CPN(C)

The Canadian public heard about necrotising fasciitis - the "Flesh Eating Disease" the week before Christmas, 1994. The media headlines were filled with news of this disease which the premier of Quebec had contracted. Like many professionals in the health care sector we speculated what was happening between each of the news bulletins updating his health. One of the experts frequently quoted by the media was Dr. Donald Low, Microbiologist at Mount Sinai Hospital. The Premier survived his bout with this disease, but had his leg amputated to prevent the spread of the infection.

I had worked in the Operating Room at Mount Sinai for more than 15 years and had never seen a case of necrotizing fasciitis. Little did I know that I would soon have the opportunity to see necrotizing fasciitis in one of the patients I cared for in the Operating Room.

Necrotizing fasciitis is a soft tissue infection with the inflammatory process spreading rapidly through fat and muscle fascia. In some cases, it even spreads through the epidermis (Low, 1995). It is the emergence of a severe virulent group A Streptococcal infection which causes the sometimes fatal disease. The clinical spectrum includes shock, bacteremia, respiratory distress syndrome, and in 30% of patients, death (Stevens, 1994). One of the presenting features of this disease is the disproportionately intense pain which presents with little evidence of severe infection on initial presentation (Low, 1995). A history of trauma, however insignificant, is usually present. The disease spreads rapidly over two to four hours from the original site of injury to the surrounding tissue.

The current protocol of treatment of necrotizing fasciitis was developed by the Departments of Microbiology and Orthopaedics at Mount Sinai Hospital in

Toronto. The patient is admitted immediately to hospital. The protocol consists of antibiotic therapy of Penicillin and Clindamycin and surgical intervention. Debridement and irrigation is performed to assess the degree of destruction to the tissue.

In the Emergency Department (ER) or upon transfer to the Intensive Care Unit (ICU), the patient has multiple lines inserted for hemodynamic monitoring. Patients with necrotizing fasciitis may present with peripheral vascular dilation and decreased systemic vascular resistance. A Swan Ganz is inserted to monitor cardiac status. Patients may exhibit signs of tachycardia and decreased cardiac output due to weakened cardiac muscle. A Central line is inserted to monitor hypovolemia and resulting hypotension. An arterial line is inserted so that blood pressure can be continuously monitored and arterial blood samples can be obtained as necessary. Many patients exhibit signs of increased arterial CO<sub>2</sub>. A Foley catheter is inserted to measure hourly urinary output. A decrease in intra vascular volume will result in the kidneys retaining fluid and toxins due to poor filtration. Renal hypertension may occur which can result in renal failure. This invasive monitoring allows complete hemodynamic assessment preoperatively, intra and post operatively.

The patient is then transferred to the Operating Room (OR) for assessment of tissue damage.

The Operating Room must be prepared to receive a patient who is in shock. The anaesthetist may require the additional help of a respiratory therapist

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and nurse. Management of a patient in shock will require intensive intervention in response to hemodynamic monitoring. A circulator will be required for the scrub nurse and an additional circulator for the anesthesiologist.

The patient is anaesthetized and positioned allowing exposure of the infected area. Free draping may be appropriate as the extent of the tissue damage may not be visible prior to incision. A pre-scrub of the infected area with Providine-Iodine is completed before prepping and draping. A longitudinal incision is made. Multiple cultures (anaerobic and aerobic) of the fluid and tissues are taken. A Microbiologist will be standing by for immediate examination of the cultures. The necrotic tissue is debrided and the wound is irrigated with copious amounts of Normal Saline (NaCl) 0.9% with 50000 units of Bacitracin. The optimum application of irrigation should occur under pressure with a pulse lavage system. It is essential that all staff within the sterile field wear protective eye and face shield because of the extensive irrigation.

The wound is left open, packed with Bacitracin soaked gauze and held in place with retention suture. The protocol requires that the patient return to the Operating Room on alternate days for subsequent irrigation and debridement under emergency conditions if the patient's condition should not respond to initial therapy. Final closure of the wound will be dependent upon the patient's recovery.

The patient will be continued on a therapy of Penicillin 4 Million Units every six hours and Clindamycin 600 mg every eight hours (Green, McGeer & Low, 1996).

## Case History

A twenty year old engineering student of Chinese descent was seen at Kitchener-Waterloo Hospital. The patient had been well until the evening of February 26, when during a basket ball game, he fell on his left knee and opened a cut on the anterior aspect. The cut was rinsed, the knee wrapped with a cloth and he continued to play. He presented himself to the Kitchener-Waterloo Hospital Emergency Department at approximately midnight. He required seven sutures to close the knee wound. It was noted that the wound appeared clean, with no evidence of swelling, erythema or pus. The patient had minimal discomfort and was able to walk home. The next morning the sutures appeared clean, however the patient noted increased swelling and erythema proximal to the wound. The student walked to school and performed

his activities of daily living. At 1530 he noted increased pain in his left knee and had difficulty in walking. It was so pronounced that he purchased a set of crutches. He felt feverish and lethargic and returned home at 1800 and went straight to bed. He awakened throughout the night with chills and fever. The next morning he noted an area of larger erythema along the anterior and posterior aspects of his left leg. The leg was warm to touch and tender. At 1300 he returned to the Emergency Department. The sutures were removed and necrotic tissue was debrided. An incision and drainage was performed along the anterior aspect of the initial abrasion and pus was aspirated. The pus was sent for culture and sensitivity. The patient was admitted to hospital. An intravenous of Ancef 2Gms q6h was started. His temperature was 37.4. Laboratory analysis revealed a white blood cell count of 18.6 with 94% neutrophils and 20% bands and a creatine kinase of 163. At 2200 on February 28 it was noted that the area of erythema on his left leg had increased. Only one gram of Ancef had been administered. On March 1, it was noted that the erythema appeared to have progressed distally toward the ankle and proximately to the groin. The patient was experiencing increasing pain and neuropathic discomfort in the form of pins and needles in the involved area. An area of streaking erythema was noted along the anterior aspect of the thigh. Examination revealed an increase in temperature to 38.7 BP 130/80 and a pulse of 92 and regular. An x-ray of the leg was normal.

A culture of the area from initial pus aspirate was positive for group A streptococcus. A dose of Clindamycin 600mg was given intravenously. After consultation with physicians at Mount Sinai Hospital the patient was transferred for further assessment and treatment.

Upon arrival at Mount Sinai Hospital the patient was prepared for surgery. A Swan Ganz and central line were inserted along with two large bore IV's. A Foley catheter was inserted to monitor hourly output.

## The Operation

The Operating Room was prepared for a soft tissue dissection of the leg area. The patient was anaesthetized and an endotracheal intubation performed. The Anesthesiologist was supported by a Respiratory Technologist and Registered Nurse. A second Registered Nurse circulated for the surgical team. The left thigh and hip were prescrubbed and prepped with Betadine solution. The sterile field was estab-

lished with free drapes. A longitudinal incision was made following the lateral aspect of the left thigh and extending distally to the knee. The incision was taken down through to the subcutaneous tissue. Necrotizing fasciitis was noted, as characterized by necrosis, oedema and odour of the tissues. Multiple biopsies and cultures were obtained of both fascia and underlying muscle tissue. Debridement of infected tissues was carried out. The muscle tissue was noted to be pink and healthy after irrigation of superficial fascia using nine litres of NaCl with 50,000 units of bacitracin per litre. This solution was applied using a pulse lavage system. The sub fascial layer was not involved in the infection. The wound was left open, packed with Saline and Bacitracin soaked dressing. The patient tolerated the procedure well with no intra operative complications. Estimated blood loss was approximately 100 mls. The patient was transferred post operatively to the ICU.

Laboratory analysis confirmed the diagnosis of group A Streptococcal Fasciitis. The patient subsequently returned to the Operating Room for debridement and irrigation with packing change. The wound was left open and secondary wound closure followed. The patient continued with intravenous and oral antibiotics. Physiotherapy visited him and provided him with isometric exercises for strengthening of his left quadriceps muscle. The patient was allowed to weight bear as tolerated with crutches. The patient was discharged from hospital on March 10 with an appointment to follow up with the Microbiologist and Orthopaedic surgeon at Mount Sinai Hospital, Toronto.

#### Four Cases Treated

Mount Sinai Hospital has treated four such cases since without loss of limb using our established combined protocol of hemodynamic patient monitoring, intravenous antibiotics, and surgery involving debridement and irrigation.

"Minor trauma can precipitate a severe soft tissue infection. Pain can be the earliest and only finding. Prompt recognition of the process, antibiotic therapy and most importantly, early surgical debridement are the cornerstones of therapy," (Defers & Low, 1991).

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# Latex Allergy in the Nursing Population

By B. Cowperthwaite, K. LaPlante, B. Mahon & T. Markowski

Latex allergies have received more attention in medical texts over the last ten years. On reviewing the literature, there is documentation surrounding the effects of latex gloves with respect to allergies. There is less about specific information related to nursing and the health of nurses with respect to allergies. Yet, Pisarcik Lenehan (1997) states "An estimated 2,200,000 nurses (or one in 10 of all nurses) . . . have a latex allergy." More recently, reactions such as "airway compromise and anaphylaxis" (Pisarcik Lenehan, 1997) have been increasing. With these reactions noted, a latex allergy can be career-ending for a nurse practicing in an acute care facility. For that reason, we have chosen to analyze major health issues related to latex allergy in the nursing population. The Neuman model will provide the framework for devel-

oping effective strategies to deal with this issue.

Latex is present in patient related equipment such as intravenous tubing, adhesive tape, ambu bags, band-aids, tourniquets, endotracheal tubes, enema tubing as well as countless others. It is evident that, in providing only the basics of patient care, nurses are constantly exposed to latex products. This exposure puts nurses at risk for developing latex sensitization and/or latex allergies. Direct contact of the latex protein by wearing gloves and inhalation of latex particles aerosolized from powdered latex gloves cause the most exposure. Turjanmaa reported in 1987 that 5.6% of the nurses in surgical units were allergic to latex, compared to 2.9% in the general health care population. (Steiner & Schwager, 1995). Charpin reported a 10.6% latex allergy in operating room nurses and Iacobelli in 1992 reports a 14.4% latex allergy in operating room personnel (Steiner & Schwager, 1995). Although allergic reactions to latex were documented more than 50 years ago, it is only recently that emphasis was placed on this increasing health care problem.

Many reports of latex allergy concern atopic individuals; that is, individuals with a clinical hypersensitivity state that is subject to hereditary influences. There is a positive association between atopic status

#### Abstract

This paper analyzes the major health issue "latex allergy," and risk reduction for nurses (aggregate). First, the historical significance of latex in the environment is discussed along with our rationale for choosing latex allergy as a major health issue. Identification, description and justification of the use of Neuman's systems model are evident throughout the paper. In this model, assessment is incorporated into the nursing diagnosis of the nursing process. The second category of the nursing process, planning of actual goals, is negotiated with the client/client system. Intervention strategies are implemented in the last stage of the nursing process, nursing outcomes. The last two categories are formulated into a chart for better clarification of the goals with rationale. Lastly, an evaluation of the goals is discussed.

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